

1 1. A method comprising:
2 forming a trench in each of two semiconductor
3 substrates;
4 providing a catalyst in the trench; and
5 combining said substrates in face-to-face
6 abutment with said trenches in alignment with one another.

1 2. The method of claim 1 including forming a channel
2 that communicates from opposed ends of each trench to the
3 edge of each substrate to allow fluid to circulate through
4 the substrates via the channels and the trenches.

1 3. The method of claim 1 including combining said
2 substrates using copper-to-copper bonding.

1 4. The method of claim 3 including masking said
2 catalyst to avoid coating the catalyst with the copper.

1 5. The method of claim 4 including lifting off a
2 resist to remove the copper from the catalyst.

1 6. The method of claim 1 including depositing the
2 catalyst in the trench.

1 7. The method of claim 6 including depositing
2 platinum or lead in said trench.

1 8. An integrated re-combiner comprising:
2 first and second semiconductor substrates, said
3 substrates bonded in face-to-face abutment;
4 each of said substrates including a trench, the
5 trench in each substrate aligned with the trench in the
6 other substrate; and
7 a catalyst material in at least one of said
8 trenches.

1 9. The re-combiner of claim 8 wherein said catalyst
2 material lines both of said trenches.

1 10. The re-combiner of claim 8 including channels
2 which communicate from the edges of said substrates to said
3 trenches to allow fluid circulation.

1 11. The re-combiner of claim 8 including copper-to-
2 copper bonding between said substrates.

1 12. The re-combiner of claim 8 wherein said catalyst
2 is platinum.

1 13. The re-combiner of claim 8 wherein said catalyst
2 is lead.

1 14. A method comprising:
2 forming a trench in an integrated circuit
3 substrate;
4 lining the trench with a catalyst material to
5 remove gases from a circulating fluid;
6 forming channels that align with said trench to
7 allow fluid circulation across said substrate and through
8 said trench.

1 15. The method of claim 14 including protecting said
2 catalyst when forming said channels.

1 16. The method of claim 14 including depositing
2 platinum as said catalyst in said trench.

1 17. The method of claim 14 including depositing lead
2 in said trench of said catalyst.